

TABLE 1
MEAN BIOMETRICS OF WILD *GEOCLEMYS HAMILTONII*

Biometrics	Male (n=4)	Female (n=4)	Mean (Both Sexes Combined) (n=8)
Carapace length (cm)	32.5	30.1	31.3
Carapace width (cm)	19.63	18.35	18.99
Plastron length (cm)	28.3	28.03	28.16
Shell height (cm)	12.0	12.08	12.04
Weight (gm)	3275	3037	3156

n = sample size.

undeveloped. This indicates that this species is capable of laying two or more clutches annually. Based on queries, Das (1991) speculated that *Geoclemys hamiltonii* may lay twice in a year. Our observation reveals that this species lays some time in mid April. Laying time of the second clutch and inter-clutch period is not known. The clutch size and size of the eggs is comparable with that of larger roof turtles namely, *Kachuga kachuga* and *Kachuga dhongoka*.

G. hamiltonii is probably the only one of larger freshwater Indian emydid turtles wherein males grow to female size or even larger. In the case of other larger Indian freshwater emydids, the three striped roof turtle, *Kachuga dhongoka*, Painted roof turtle, *Kachuga kachuga* and Crowned river turtle, *Hardella thurjii* males are significantly smaller than females.

The present report is the first record of breeding season, clutch size and sex ratio of the wild population of *G. hamiltonii*. Also, the specimen with SCL 39 cm is the largest size record of this species.

Funds for the field work was availed from the WII-USFWS Turtles and Tortoises Conservation Project sponsored through the Ministry of Environment and Forests, Government of India. We are thankful to the Chief Conservator of Forest (Wildlife), Assam for permission and the staff at Kaziranga National Park for help in the field.

April 27, 1993

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20. THE DISTRIBUTION OF THE ASIAN BROWN TORTOISE (*MANOURIA EMYS*) IN INDIA AND THE TAXONOMIC STATUS OF SUBSPECIES

(With a text-figure)

The Asian brown tortoise (*Manouria emys*), the largest of Asian tortoises is widely distributed in Southeast Asian countries. In the subcontinent, it is recorded in Bangladesh and Northeast Indian states, namely Nagaland, Assam and Meghalaya (Smith 1931, Das 1991). Barring one locality record of the Asian brown tortoise in Meghalaya by Das (1991), no reliable record of this tortoise

is available in other part of India after Smith (1931).

As a part of the Wildlife Institute of India, Dehra Dun and US Fish and Wildlife Service collaborative Turtle and Tortoise Project's survey programme, North Cachar Hills, Kaziranga National Park, Orang and Nameri Wildlife Sanctuaries in Assam and Namdapha Tiger Reserve, Pakhui, Itanagar, Mehao, D'Ering

Wildlife Sanctuaries in Arunachal Pradesh were surveyed from March 12 to April 25, 1992 for turtles and tortoises.

The Asian brown tortoise was recorded only in Mupa-Lantang Reserve Forest, North Cachar Hills, Assam. Five complete plastrons were obtained from the 'Kasari Dimasa' tribal located inside the Mupa-Lantang Reserve Forest. These tribals name this tortoise as 'Yado' = big tortoise. According to them the Asian brown tortoise is distributed sparsely in the forests of North Cachar Hills. They hunt the Asian brown tortoise for food during 'jhooming' (April-May) when the tortoise take refuge in wet stream beds.

Two subspecies namely, *Manouria emys phayrei* (northern subspecies) and *Manouria emys emys* (southern subspecies) have been reported so far (Das 1991). Also, it is recorded that both subspecies differ in pectoral scute contact in the plastral mid line, i.e. northern subspecies with pectoral scutes meeting in the midline of the plastron; southern subspecies with pectorals not meeting in the midline (Fig. 1).

Five plastrons of this tortoise were recorded during this survey with plastron length 36.5, 38.0, 39.0, 40.0, 41.0 cm respectively. Of these three had characteristics of the southern subspecies. The pectorals of these three specimens were placed 2.5-3.8 cm away from the plastral midline. The other two plastrons had pectorals meeting each other on the midline (characteristic of the northern subspecies). One example of each of the morphotypes is deposited with the collections of the WII-USFWS Turtle project at the Wildlife Institute of India, Dehra Dun.

It is reported that the Asian brown tortoises collected by Anderson in Naga hills of Nagaland possessed examples with characteristics of both subspecies. Anderson believed that both subspecies were taxonomically inseparable (Anderson in Das 1991). The present records which are west of Naga Hills also have both examples. Also, records of intergrade (*emys-phayrei*?) of this species have been reported further west (in Bangladesh) and south (in Thailand, Das 1991). All these support the

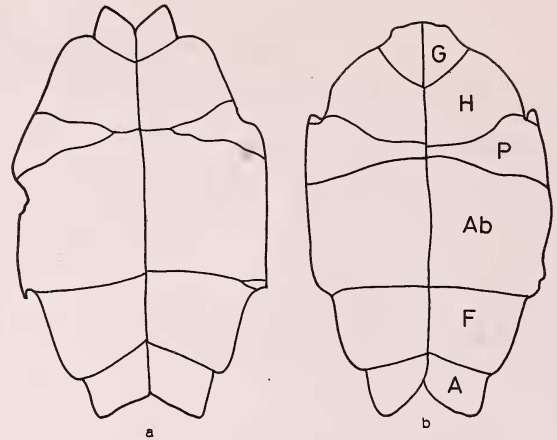


Fig. 1. Plastral scute variation observed in the Asian brown tortoise (*Manouria emys*).

a. Plastron of *Manouria emys emys*; b. Plastron of *Manouria emys phayrei*.

Abbreviations: G—Gulars; H—Humeral; P—Pectoral; Ab—Abdominal; F—Femoral; A—Anal.

view of Anderson as these subspecies lack distinct demarcation in the northwestern portion of the range. Hence, the taxonomic status of the current subspecies assignment of Asian brown tortoise (*Manouria emys*) is doubtful and needs re-evaluation.

Funds for the turtle and tortoise survey in Northeast India was availed from the WII-USFWS Turtle and Tortoise Project. Thanks are due to the Chief Conservator of Forest, Assam for necessary permission and field officials at the Divisional Forest Office, North Cachar Hills, Haflong for help and cooperation for the survey. Also, I am grateful to Mr Moloy Bora, ACS and Deputy Commissioner, North Cachar Hill Council, Haflong for help and hospitality during the survey. I am thankful to Dr E.O. Moll, Eastern Illinois University, USA and to Mr B.C. Choudhury, Scientist 'SE', Wildlife Institute of India (WII), Dehra Dun for going through earlier drafts of this paper and comments. Ms Asha of the WII, Dehra Dun neatly sketched the plastrons of the tortoises.

April 13, 1993

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21. ADDITIONAL LOCALITY RECORDS FOR TWO INDIAN TORTOISE SPECIES

Five species of tortoises have been reported from the Indian subcontinent. They are, 1. Indian starred tortoise (*Geochelone elegans*); 2. Travancore tortoise (*Indotestudo forstenii*); 3. Elongated tortoise (*I. elongata*); 4. Asian brown tortoise (*Manouria emys*) and 5. Afghan four-toed tortoise (*Testudo horsfieldii*). In the subcontinent, the Afghan four-toed tortoise is distributed only in Pakistan. Updated information on the distribution of the Indian tortoises is available in Das (1991). The present note gives specific locality record for the Elongated tortoise and Indian starred tortoise.

Elongated tortoise (*Indotestudo elongata*)

The elongated tortoise is distributed in north and northeast India along the distribution of the sal (*Shorea robusta*) forest. The continued existence of this species in Simlipal Tiger Reserve, Orissa; Saranda Reserve Forest, Chaibassa in Bihar; Jalpaiguri forest and Buxa Tiger Reserve in West Bengal; Garo hills in Meghalaya and Corbett National Park in Uttar Pradesh has been reported (Frazier 1992). But nowhere in India, is the elongated tortoise common. It is listed as endangered in the Red Data Book of the IUCN (Groombridge 1982).

On May 20, 1990, a tortoise was photographed by one of us (SFWS) in Siggudi forest near Kotdwara in the corridor connecting Rajaji and Corbett National Parks. This was later identified as the elongated tortoise, *Indotestudo elongata*. The tortoise was found active on a dried stream bed intersecting the sal forest. The colour transparency is in the collection of WII-USFWS Turtle Project.

This species is reported to be present in Dehra Dun based on a specimen collected before 1970 in Phandowala near Dehra Dun (Frazier 1992). The present record confirms the continued survival of the elongated tortoise in the sal forests of Rajaji National Park. The Rajaji National Park is located at the Northwestern limit of this tortoise's distribution.

Indian starred tortoise (*Geochelone elegans*)

The Indian starred tortoise is widely distributed in semi arid states of India (Das 1991). Mudumalai wildlife sanctuary in Tamil Nadu was surveyed for tortoises during 23-27 December 1991. One complete shell (carapace length 6.5 cm, width 5.3 cm and plastron length 5.5 cm) in the tribal camp in Anaikatty, a plastron in the Irula tribal camp in Moyar and a portion of a plastron in the scrub jungle near Masinagudi was recorded. Subsequently, C.S. Silori has recorded six Indian starred tortoises from January to August 1992. All these sightings were in the scrub jungle near Masinagudi, Moyar and Vazhathottam in Mudumalai wildlife sanctuary. One shell and three photographs have been deposited in the WII-USFWS Turtle Project collection.

In Tamil Nadu, this species has been reported from Mambakkam, Pudukottai and Ramanad (Das 1991). The present record in the Protected Area, i.e. Mudumalai wildlife sanctuary is an additional locality for the Indian starred tortoise. The highest elevation at which this species has been reported was 450 m at Erinpura, Jalor district in Rajasthan. The present records are at elevations between 850 and 950 m is a significant altitudinal extension in the distribution of the species.

In recent years, the Indian starred tortoise has